

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference 104111-WO-00	FOR FURTHER ACTION	See item 4 below
International application No. PCT/JP2004/006427	International filing date (<i>day/month/year</i>) 06 May 2004 (06.05.2004)	Priority date (<i>day/month/year</i>) 07 May 2003 (07.05.2003)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant SUMITOMO ELECTRIC INDUSTRIES LTD.		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).
2. This REPORT consists of a total of 5 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report |
| <input type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input type="checkbox"/> | Box No. VIII | Certain observations on the international application |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 740 14 35	Date of issuance of this report 16 March 2006 (16.03.2006) Authorized officer <div style="text-align: center; font-weight: bold; font-size: 1.2em;">Yoshiko Kuwahara</div> Telephone No. +41 22 338 90 90
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PATENT COOPERATION TREATY

Translation

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing
(day/month/year)

Applicant's or agent's file reference

104111-WO-00

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/JP2004/006427

International filing date (day/month/year)

06.05.2004

Priority date (day/month/year)

07.05.2003

International Patent Classification (IPC) or both national classification and IPC

Applicant

SUMITOMO ELECTRIC INDUSTRIES LTD.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/JP

Authorized officer

Facsimile No.

Telephone No.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2004/006427

Box No. I

Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language
_____, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/JP2004/006427

Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1. Statement			
Novelty (N)	Claims	1-16, 22-24, 32-34, 36, 37	YES
	Claims	17-21, 25-31, 35	NO
Inventive step (IS)	Claims		YES
	Claims	1-37	NO
Industrial applicability (IA)	Claims	1-37	YES
	Claims		NO
2. Citations and explanations:			
<p>Document 1: JP, 3-237088, A (Nippon Mining Co., Ltd.), 22 October, 1991 (22.10.91)</p> <p>Document 2: JP, 2000-313699, A (Japan Energy Corp.), 14 November, 2000 (14.11.00)</p> <p>Document 3: JP, 3-40987, A (Nippon Telegraph And Telephone Corp.), 21 February, 1991 (21.02.91)</p> <p>Document 4: P. Rudolph et al., Studies on interface curvature during vertical Bridgman growth of InP in a flat-bottom container, Journal of Crystal Growth, 1996, Vol. 158, pp. 43-48</p> <p>(Claims 1-16) The subject matters of claims 1-16 do not appear to involve an inventive step in view of documents 1, 2 cited in the ISR. The inventions of documents 1 and 2 have the same technical issue in the point of obtaining a high-quality InP single crystal. The idea of applying the means of making the density of foreign matter uniform throughout the crystal through heat treatment as described in document 2 in order to solve this shared technical issue in the large diameter InP single crystals with added foreign matter of document 1 could be easily conceived by a person skilled in the art.</p> <p>(Claims 17-21, 25, 26) The inventions of claims 17-21, 25, 26 do not appear to be novel in view of documents 3, 4 cited in the ISR. Documents 3, 4 disclose a method to produce a single crystal using a seed crystal having a sectional area of at least 15% compared to the crystal body.</p> <p>(Claims 22-24) The subject matters of claims 22-24 do not appear to involve an inventive step in view of documents 1, 3 cited in the ISR. The inventions of documents 1 and 3 have the same technical issue in the point of obtaining a high-quality compound semiconductor single crystal. The idea of applying the means of reducing the dislocation density as described in document 1 to solve this shared technical issue in the method to produce single crystals of document 3 could be easily conceived of by a person skilled in the art.</p> <p>(Claims 27-29) The inventions of claims 27-29 do not appear to be novel in view of document 3 cited in the ISR. The growth speed of crystals in the invention described in document 3 can be set as required.</p> <p>(Claims 30, 31) The inventions of claims 30, 31 do not appear to be novel in view of documents 3, 4 cited in the ISR. The inventions described in documents 3, 4 fulfill the definitions of claims 30, 31.</p> <p>(Claims 32, 33) The subject matters of claims 32, 33 do not appear to involve an inventive step in view of documents 1, 3 cited in the ISR.</p>			

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2004/006427

Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

The inventions of documents 1 and 3 have the same technical issue in the point of obtaining a high-quality compound semiconductor single crystal. The idea of applying the means of enlarging the diameter of the single crystal as described in document 1 to solve this shared technical issue in the method to produce single crystals of document 3 could be easily conceived of by a person skilled in the art.

(Claims 34-37)

The subject matters of claims 34-37 do not appear to involve an inventive step in view of documents 2, 3 cited in the ISR.

The inventions of documents 2 and 3 have the same technical issue in the point of obtaining a high-quality compound semiconductor single crystal. The idea of applying the means of adding foreign matter as described in document 2 to solve this shared technical issue in the method to produce single crystals of document 3 could be easily conceived of by a person skilled in the art.